

Database Management: Normalization Exercise Suite



The ***Emergency Service & Product*** (ESP)

Company is a very small parts and service company. It currently uses a crude paper based system (3 by 5 cards, paper journal, etc) to keep track of its customers, inventory, suppliers, payments and invoices.

The company is growing rapidly and has found that it is unable to keep pace with the volume of data it must record about its business activities. It has decided that it wishes to automate some portions of its business.

You have been hired to assist the company in analyzing its business activities and to design a set of relational tables that they can use to develop a database system.

The company will provide you with copies of all their paper based forms (invoices, orders, deposit batch records, etc). You will use these over several weeks to analyze the various forms and produce **third normal form (3NF)** relational **entity relationship diagrams (ERD)** for each **view** of their data. As a last step in the process, you will **merge** all the views to produce **one integrated ERD** and **fully detailed relational entities**.

Customer Payments Against Orders

ESP allows its customers to make payments against their orders in several ways. These include:

- Full payment at the time of order
- Partial payment at the time of order with final payment(s) at a later time
- No payment at time of order with final payment(s) at a later time
- Payments can be made by cash, cheque, Visa, America Express, etc

ESP keeps a payment log to keep track of all payments made against an order. Each order has its own log sheet. The log looks similar to the

<i>Payments Log</i>					Order Number:
<u>123</u>					
Customer Name: <u>David Williams</u>					Order Date:
<u>Jan 11/99</u>					
Customer Number: <u>78</u>					Order Total:
<u>\$145.18</u>					
Date	Payment Amount	Payment Number	Balance Owing	Payment Type	Deposit Batch #
Jan 11/99	100.00	1	45.18	Cheque	118

following:

Note that a customer payment is applied against a single order.

When a payment is made, ESP goes through the following process (worst case scenario – where a cheque arrives in the mail with no indication of an order number on it):

- Customer name is searched in the customer file to determine their customer number. The address on the cheque is used to confirm the customer.
- The Orders File and the Payments Log are manually searched by customer number to find any order(s) that have an outstanding balance.
- If this is the first payment for this order, then a new Payment Log form is filled in with customer name, number, etc.
- The payment details are entered and the balance owing is updated.
- The Deposit Batch # is entered on the log when the payment is deposited into the bank so that the payments can be reconciled with the deposit on the bank statement.

ESP has indicated that there are never any over payments made and refunds or cancellations are never issued.

ESP has also indicated that they would like the new system to only allow specific payment types so they can monitor usage of each type.

You are to take the information provided above and prepare a set of **3NF** relational entities and produce a relational **3NF ERD**.